What's Happening

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Growth mindset, performance avoidance, and academic behaviors in Clark County School District

Jason Snipes
Loan Tran
WestEd

Key findings

This study examined student and teacher attitudes and beliefs about growth mindset (beliefs about the malleability of ability and the payoff for student effort), performance avoidance (hiding one's effort or refraining from making an effort due to concerns of failure or embarrassment), and academic behaviors (such as completing homework and participating in class) in Nevada's Clark County School District. Most students reported beliefs that are consistent with a growth mindset. Students' reported levels of growth mindset, performance avoidance, and academic behaviors differed significantly by grade level, prior academic achievement, English learner status, and race/ethnicity. By contrast, for the most part teachers' beliefs did not vary significantly according to the characteristics of the students in their schools.

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Summary

Interest has been growing in the role of students' attitudes, beliefs, and dispositions as key factors that can support or inhibit student success (Dweck, Walton, & Cohen, 2011; Farrington et al., 2012; Snipes, Fancsali, & Stoker, 2012; Tough, 2013). A large body of emerging evidence, including multiple randomized controlled trials, shows that interventions that target academic mindsets, attitudes, and beliefs about the nature of ability and the payoff to effort can lead to improved academic outcomes through changes in student disposition toward academic work and increased academic effort (Farrington et al., 2012; Snipes et al., 2012; Yeager & Walton, 2011).

The evidence and theory on academic mindsets and outcomes suggest an important role for teachers and peers in generating, supporting, and reinforcing these attitudes and beliefs, thereby facilitating improved academic outcomes, or, conversely, in undermining these attitudes and beliefs, thereby disrupting students' academic progress. However, little is known about the distribution of these attitudes and beliefs among students and teachers in different academic contexts, such as schools with different average academic achievement levels or schools with students with different demographic characteristics. With this in mind Regional Educational Laboratory West, in collaboration with Nevada's Clark County School District, collected and analyzed survey data from students and teachers throughout the district on attitudes, beliefs, and dispositions toward academic mindsets. This study focused on measures of three constructs: growth mindset (believing in the malleability of ability and payoffs from student academic effort), performance avoidance (hiding one's effort or refraining from making an effort due to concerns of failure or embarrassment), and academic behaviors (such as completing homework and participating in class).

Most students reported beliefs that are consistent with a growth mindset. Most students reported that they engage in behaviors that support academic achievement at least "most of the time" and that it was either "not at all true" or "a little true" that they engaged in performance avoidance in a typical class. However, student measures of growth mindset varied significantly by grade level, prior academic achievement, English learner status, and race/ethnicity. Growth mindset scores were 0.2–0.8 standard deviation lower for students with lower prior academic achievement, English learner students, and Black students than for their higher achieving, non–English learner, and White counterparts. Performance avoidance scores were higher for students with lower prior academic achievement, English learner students, and Black students. And growth mindset scores and academic behaviors scores were lower for students in lower achieving schools and schools with higher percentages of English learner students and economically disadvantaged students. Though the differences (0.1–0.2 standard deviation) were not as large as the differences associated with prior academic achievement and English learner status, growth mindset, performance avoidance, and academic behaviors scores also varied by grade level; growth mindset scores and academic behaviors scores were lower for students at higher grade levels while performance avoidance scores were higher.

A majority of teachers also reported beliefs about the malleability of their students' academic abilities that were consistent with a growth mindset. In fact, teachers' growth mindset scores were significantly higher than students' scores. Moreover, teachers' scores did not vary significantly by the average academic achievement or percentage of English learner students or economically disadvantaged students in the school. However, teachers'

growth mindset scores were lower for teachers at higher grade levels than for teachers at lower grade levels.

The presence of significant differences in students' self-reported beliefs and behaviors by prior academic achievement, English learner status, and race/ethnicity is consistent with the hypothesis that attitudes and beliefs about the nature of academic ability and about the payoff for academic effort play a role in disparities among students in academic achievement. The finding of such differences is also consistent with the hypothesis that students' academic experiences shape their academic beliefs and behaviors. Further research using longitudinal data and designs capable of isolating causality are necessary to understand the relationship between academic mindsets and academic outcomes.

Because previous research has shown that interventions targeting academic mindsets have positive effects on academic achievement, the disparities in academic mindsets across student subgroups suggest that these beliefs may be important targets for interventions. They also suggest that intervening to support the development of a growth mindset could be particularly useful for English learner students, as well as for low-achieving, Black, and Hispanic students. The presence of significant differences in growth mindset, performance avoidance, and academic behaviors across schools with different average academic achievement and schools with different percentages of economically disadvantaged students suggests that school context and its relationship to students' academic mindsets and behaviors may be an important area for further investigation.

Contents

Summary i

Why this study? 1
The logic underlying mindset interventions 1
Evidence connecting academic mindsets and academic outcomes 3

What the study examined 4

What the study found 6
Levels of growth mindset, performance avoidance, and academic behaviors reported by students 6
Variation in students' reported levels of growth mindset, performance avoidance, and academic behaviors by grade level, prior academic achievement, sociodemographic characteristics, and school characteristics 7
Levels of growth mindset, student performance avoidance, and student academic behaviors reported by teachers 11
Variation in teachers' growth mindset and in student performance avoidance and student academic behaviors reported by teachers, by school characteristics 12

Implications of the study findings 14

Limitations of the study 17

Appendix A. Survey constructs A-1

Appendix B. Survey response rates B-1

Appendix C. Clark County School District survey sampling strategy C-1

Appendix D. Pairwise significance tests D-1

Appendix E. Confirmatory factor analysis E-1

Notes Notes-1

References Ref-1

Box
1 Key terms 1

Figures
1 Academic mindsets logic model 2
2 Most students reported having beliefs consistent with a growth mindset, not engaging in performance avoidance, and engaging in academic behaviors on a Clark County School District survey, 2015 7

3 Most teachers reported that they had beliefs consistent with a growth mindset and that their students engage somewhat in performance avoidance and academic behaviors on a Clark County School District survey, 2015 12

Tables

1 Average student growth mindset, performance avoidance, and academic behaviors scores on a Clark County School District survey, by grade level, 2015 6
2 Average student growth mindset, performance avoidance, and academic behaviors scores on a Clark County School District survey, by student characteristic, 2015 9
3 Average student growth mindset, performance avoidance, and academic behaviors scores on a Clark County School District survey, by school characteristic, 2015 10
4 Average student and teacher growth mindset, performance avoidance, and academic behaviors scores based on students' responses and on teachers' responses about their students on a Clark County School District survey, 2015 11
5 Average teacher growth mindset scores and student performance avoidance and student academic behaviors scores based on teachers' responses on a Clark County School District survey, by grade level, 2015 13
6 Average teacher growth mindset scores and student performance avoidance and student academic behaviors scores based on teachers' responses on a Clark County School District survey, by school characteristics, 2015 14
A1 Clark County School District survey measures and internal consistency statistics, 2015 A-1
B1 Survey response rates among Clark County School District students, 2015 B-1
B2 Characteristics of Clark County School District student respondents and nonrespondents, 2015 B-2
D1 Significance tests for pairwise differences in average growth mindset, performance avoidance, and academic behaviors scores among students in Clark County School District, by grade level and race/ethnicity, 2015 (mean difference) D-1
D2 Significance tests for pairwise differences in average growth mindset, performance avoidance, and academic behaviors scores among teachers in Clark County School District, by grade level, 2015 (mean difference) D-1
E1 Confirmatory factor analysis for one- and three-factor models for the Clark County School District survey, by sample group, 2015 (n = 103,066) E-1

Why this study?

Although the role of student attitudes and beliefs in education has been studied for many years, interest has recently increased in the role of academic mindsets (student attitudes, beliefs, and dispositions; see box 1 for definitions of key terms used in the report) as a key factor in academic success. Academic mindsets have been shown to be highly correlated with academic engagement and with success in both secondary and postsecondary education. Recent evidence, including several randomized controlled trials, has shown that low-cost short-term interventions targeting academic mindsets can lead to substantial improvements in academic achievement (as measured by grades and test scores; Dweck et al., 2011; Farrington et al., 2012; Snipes et al., 2012; Tough, 2013; Yeager & Walton, 2011).

Academic mindsets have been shown to be highly correlated with academic engagement and with success in both secondary and postsecondary education

The logic underlying mindset interventions

The primary logic underlying interventions that aim to develop positive academic mindsets is that such interventions can change students' beliefs about the nature of academic ability, their own potential for success, and the payoff for academic effort. The logic model developed by Farrington et al. (2012) hypothesizes that student academic mindsets drive academic perseverance and therefore academic behaviors, such as attending class, paying attention in class, completing homework, and studying (figure 1). Greater engagement in academic behaviors, in turn, results in improved academic outcomes, including higher grades and test scores (Farrington et al., 2012; Snipes et al., 2012; Yeager & Walton, 2011).

An important dimension of academic mindsets is a set of beliefs referred to as a growth mindset—the belief that academic ability or intelligence is not fixed but can be changed and enhanced over time through one's own effort (Dweck & Leggett, 1988; Dweck et al., 2011). Students who believe that their own ability is malleable are referred to as having a

Box 1. Key terms

Academic mindsets. Students' attitudes, beliefs, perceptions, and dispositions regarding themselves, their academic potential, and their relationship to school (Dweck et al., 2011).

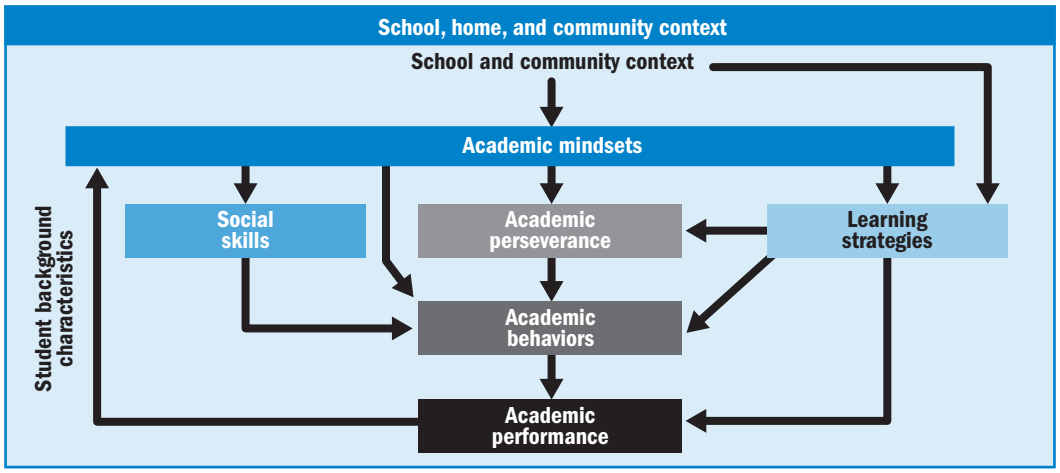
Academic behaviors. Behaviors commonly associated with being a "good student," including arriving ready to work (with necessary supplies and materials), regularly attending class, paying attention and participating in class, and devoting out-of-school time to studying and completing homework (Farrington et al., 2012).

Fixed-ability mindset. The belief that intelligence and academic ability are fixed qualities that students either possess or do not possess and that cannot be changed through effort (Dweck et al., 2011). It is a dimension of academic mindsets and is also referred to as an "entity" theory of intelligence.

Growth mindset. The belief that intelligence and academic ability are not fixed but are malleable and can be increased through effort and learning. It is a dimension of academic mindsets.

Performance avoidance. The tendency to change behavior—for example, hiding effort and avoiding academically challenging situations—because of concerns of failure or embarrassment. The concept is related to but distinct from holding a fixed-ability mindset (Farrington, Levenstein, & Keyes, 2014). It is a dimension of academic mindsets.

Figure 1. Academic mindsets logic model



Source: Adapted with permission from Farrington et al. (2012).

growth mindset, while students who believe that intelligence or academic ability is fixed and cannot be changed through their own efforts are sometimes referred to as having a fixed-ability mindset (Blackwell, Trzesniewski, & Dweck, 2007). Students who have a growth mindset have more reason to believe that their performance can improve with effort. This in turn increases their incentive to make an effort to succeed academically and to engage in the academic behaviors that drive success in school. In contrast, students who hold a fixed-ability mindset are more likely to engage in performance avoidance (Farrington & Levenstein, 2013; Farrington et al., 2014). Instead of seeking opportunities to learn and grow, these students may attempt to avoid academically challenging situations that they believe may push them beyond their self-perceived limits. Performance avoidance can get in the way of engaging in the academic behaviors that are necessary to succeed in school (Farrington et al., 2012).

Academic behaviors are the primary mechanism through which academic mindsets are hypothesized to affect academic outcomes. Without changes in academic behaviors, it is difficult to imagine how and why changes in academic mindsets would result in meaningful changes in academic outcomes

Academic behaviors are the primary mechanism through which academic mindsets are hypothesized to affect academic outcomes. Without changes in academic behaviors, it is difficult to imagine how and why changes in academic mindsets would result in meaningful changes in academic outcomes. Researchers further hypothesize that short-term interventions targeting academic mindsets have the potential to generate substantial long-term effects because they trigger a positive recursive cycle connecting beliefs, academic behaviors, and academic outcomes. According to this theory, changes in student beliefs result in increased academic effort and increased success. Students' increased experiences of academic success are thought to reinforce and strengthen their newly formed beliefs about the malleability of ability, thereby reinforcing their continued engagement in academic behaviors and perpetuating this positive cycle (Cohen, Garcia, Apfel, & Master, 2006; Farrington et al., 2012; Snipes et al., 2012).

The logic model of Farrington et al. (2012) also suggests the importance of the school and classroom context. Messages from teachers, peers, or others can either support or impair the development of a growth mindset and related beliefs about the benefits of effort (Cohen et al., 2006; Farrington et al., 2012; Snipes et al., 2012). For example, in some contexts peers enforce negative rather than positive consequences for academic effort, ridiculing or

socially excluding students who demonstrate higher levels of academic effort (Fryer, 2006). These dynamics can undermine the incentive to engage in academic behaviors, thereby disrupting the cycle connecting academic mindsets to better academic outcomes. Both ineffective instruction and students' lack of readiness for school may also disrupt this cycle by reducing the effectiveness of students' academic efforts, undermining students' belief that effort pays off in improved performance (Snipes et al., 2012).

Evidence connecting academic mindsets and academic outcomes

Multiple studies have shown that interventions targeting academic mindsets can have substantial positive effects on academic outcomes (Dweck et al., 2011; Snipes et al., 2012). For example, a 2003 randomized controlled trial tested an intervention in which grade 7 students communicated throughout the school year with a mentor who taught them about the expandable nature of intelligence (Good, Aronson, & Inzlicht, 2003). Mentors met with students for two 90 minute sessions, one in the beginning of the school year and another in the middle of the school year. The rest of the communication occurred through weekly emails and through help in designing a webpage in which the students advocated the messages conveyed by the mentor. Control group students received mentors who focused instead on the perils of drug use. The students participating in the intervention scored substantially higher (0.4–1.3 standard deviations, depending on gender and subject) on state assessments of reading and math than did their control group counterparts. In another study, researchers used 25-minute weekly advisories to teach low-income, low-achieving grade 7 students that their brains are malleable and that what people commonly think of as intelligence actually grows with effort. Students read materials and participated in discussions where they learned that their brains grow smarter and make new connections as they learn. Grades declined for students randomly assigned to a control group that did not participate in the sessions, while grades stabilized for students in the treatment group, resulting in a statistically significant net difference of 0.3 grade point in math (Blackwell et al., 2007). Studies conducted among racial/ethnic minority students entering college show similar effects (Walton & Cohen, 2011; Wilson & Linville, 1985).

School norms and peer beliefs regarding the nature of academic ability and the value of effort may shape academic mindsets and, through them, students' academic behaviors and outcomes

School norms and peer beliefs regarding the nature of academic ability and the value of effort may shape academic mindsets and, through them, students' academic behaviors and outcomes. Recent analysis of data from Chicago Public Schools revealed that school-level average measures of students' beliefs in a growth mindset were higher in "no excuses"-type charter schools than in typical comprehensive schools. In addition, a multilevel analysis of these data showed that school-level average reports of growth mindset were stronger predictors of student academic achievement gains over time than were measures of individual students' beliefs in growth mindset (West et al., 2014). Though other unmeasured dimensions of school quality could be driving the relationship, these patterns suggest that school norms and peer academic mindsets and behaviors may be a particularly important avenue for exploration.

What teachers communicate to students about what they expect of them and why can have a major impact on academic outcomes. For example, a randomized controlled trial of an intervention involving teacher feedback suggests that "wise critical feedback," an approach that combines critical feedback with the message that students are receiving the feedback because teachers believe in their ability to produce high-quality work, yields substantial increases in the degree of student effort, the quality of students' work, and the

level of their grades compared with providing critical feedback alone (Yeager et al., 2013). In short, the available evidence supports the hypothesis that both teachers and school context can affect academic mindsets and behaviors in meaningful ways.

Despite the potential importance of teachers' beliefs and expectations and their potential effects on students' experience, little is known about the distribution of academic mindsets among teachers. It might be important to know, for example, the extent to which teachers believe that their students' academic ability is malleable and that there is a meaningful payoff for students' academic efforts. There is also little research on the manner in which student and teacher academic mindsets vary across different academic contexts, including schools serving different student populations.

The extent to which teachers' beliefs about growth mindset and the value of their students' academic efforts vary across schools serving students with different economic and demographic characteristics could have important implications for practice. It could affect the degree to which teachers' beliefs and attitudes should be among the primary targets of education interventions. It might also have implications for the types of supports that might be necessary for teachers to be maximally effective in different environments. Similarly, understanding how student academic mindsets and behaviors vary across student groups, grades, and school contexts may help practitioners better understand student needs and the manner in which and the extent to which positive academic mindsets require more or less support among different types of students or within different contexts.

The extent to which teachers' beliefs about growth mindset and the value of their students' academic efforts vary across schools serving students with different economic and demographic characteristics could have important implications for practice

This study was initiated in collaboration with Nevada's Clark County School District, as part of Regional Educational Laboratory West's work with the Nevada Education Research Alliance. District staff were interested in learning more about student attitudes, beliefs, disposition, and behaviors, which research has shown are related to academic success and failure, and in understanding the extent to which these varied across different student groups within the district. Clark County School District is a particularly useful place to conduct this investigation. Large urban school districts like Clark County School District educate a disproportionately large number of English learner students, economically disadvantaged students, Black students, and Hispanic students. Better understanding the dynamics around academic mindsets and behaviors in large urban districts may better position practitioners to develop and refine interventions that can leverage academic mindsets and behaviors in order to improve student academic achievement in such districts, thereby contributing to an overall improvement of academic outcomes in urban settings and a reduction of economic, language, and racial academic achievement gaps throughout the public education system.

What the study examined

This study, conducted in collaboration with Clark County School District, examined the academic mindsets and behaviors of a sample of students and teachers in grades 4–12 throughout the school district. The study addressed four research questions:

- What levels of growth mindset, performance avoidance, and academic behaviors did students report?
- How did students' reported levels of growth mindset, performance avoidance, and academic behaviors vary by grade level, prior academic achievement, sociodemographic characteristics, and school characteristics?

- What levels of growth mindset, student performance avoidance, and student academic behaviors did teachers report?
- How did teachers' reported levels of growth mindset, student performance avoidance, and student academic behaviors vary by school characteristics?

This study used district administrative records and survey data on student and teacher self-reports of academic mindsets and academic behaviors collected in spring 2015 by Clark County School District, a diverse urban school district that is the fifth largest in the country

The study used district administrative records and survey data on student and teacher self-reports of academic mindsets and academic behaviors collected in spring 2015 by Clark County School District, a diverse urban school district that is the fifth largest in the country. It serves approximately 318,000 students, many of whom are English learner students, economically disadvantaged students, or racial/ethnic minority students. In 2014/15, 17 percent of district students were English learner students; 58 percent were economically disadvantaged (as measured by eligibility for the federal school lunch program); and 45 percent were Hispanic and 13 percent were Black. In 2015 the district employed approximately 14,000 classroom teachers (U.S. Department of Education, 2015) in 49 high schools, 59 middle schools, and 217 elementary schools (Clark County School District, 2015).

Each year the district administers surveys on a variety of student experiences and perceptions to every student in grades 4–12 and to every teacher in the district. In spring 2015 the district added a set of items measuring growth mindset, performance avoidance, and academic behaviors (see table A1 in appendix A for the survey items that make up each measure, along with information on the reliability of each measure). Students were surveyed about their academic mindsets and behaviors. The annual teacher survey included a parallel set of questions worded to focus on teachers' beliefs regarding the malleability of ability and the payoff to academic efforts among their students (growth mindset) and their perceptions and observations about their students' performance avoidance and academic behaviors (see table A1 in appendix A). For example, the teacher growth mindset questions asked teachers the extent to which they believed in their students' ability to change their academic outcomes through their own efforts, while questions about performance avoidance and academic behavior asked teachers about the extent to which they observed certain behaviors among their students.

The surveys were answered by 121,835 students and 6,574 teachers (see appendix B for survey response rates). The analysis reflects the responses of the 103,066 students for whom data were available on responses to all items related to growth mindset, performance avoidance, and academic behaviors and all prior academic achievement and demographic characteristics, and the responses of the 5,721 teachers in schools with sufficient sample sizes for whom data were available on responses to all items related to growth mindset, performance avoidance, and academic behaviors and school identification information. See appendix B for more information on response rates and appendix C for more information on sampling methodology.

Each respondent's score on these measures was calculated by averaging each respondent's answers to the constituent items for each measure. The study team then analyzed the extent to which scores on these measures varied across different groups of students, teachers, and schools in Clark County School District.

Key categories for analysis included grade level and prior achievement. This study used three grade level categories: elementary school (grades 4–5), middle school (grades 6–8),

and high school (grades 9–12). Prior academic achievement was measured using the proficiency category that each student reached on the Nevada Criterion Reference Tests math assessment from the previous academic year for elementary and middle school students and from grade 8 for high school students. The categories of prior academic achievement are as follows:

- Emergent: student occasionally applies or does not apply skills or strategies and requires extensive remediation.
- Approaches the standard: student inconsistently or incompletely applies skills or strategies and requires targeted remediation.
- Meets the standard: student consistently applies skills or strategies without need for remediation.
- Exceeds the standard: student comprehensively or consistently applies and generalizes skills or strategies in a variety of situations.

What the study found

This section reports findings regarding survey measures of growth mindset, performance avoidance, and academic behaviors in Clark County School District.

Levels of growth mindset, performance avoidance, and academic behaviors reported by students

The average growth mindset score across all students was 4.0 on a scale of 1 to 5 (where 1 indicates agreement with all statements that suggest a fixed-ability mindset and 5 indicates disagreement with all statements that suggest a fixed-ability mindset)

A majority of students reported having beliefs that were consistent with a growth mindset. The average growth mindset score across all students was 4.0 on a scale of 1 to 5 (where 1 indicates agreement with all statements that suggest a fixed-ability mindset and 5 indicates disagreement with all statements that suggest a fixed-ability mindset; table 1). Some 74 percent of students had a score of 4 or 5 (figure 2). In other words, on average almost three-quarters of students responded that statements suggesting that ability is fixed and that there is little that they can do to change it were either "not at all true" or "a little true."

Almost 40 percent of students reported that it was at least somewhat true that they engaged in performance avoidance. The average performance avoidance score across all

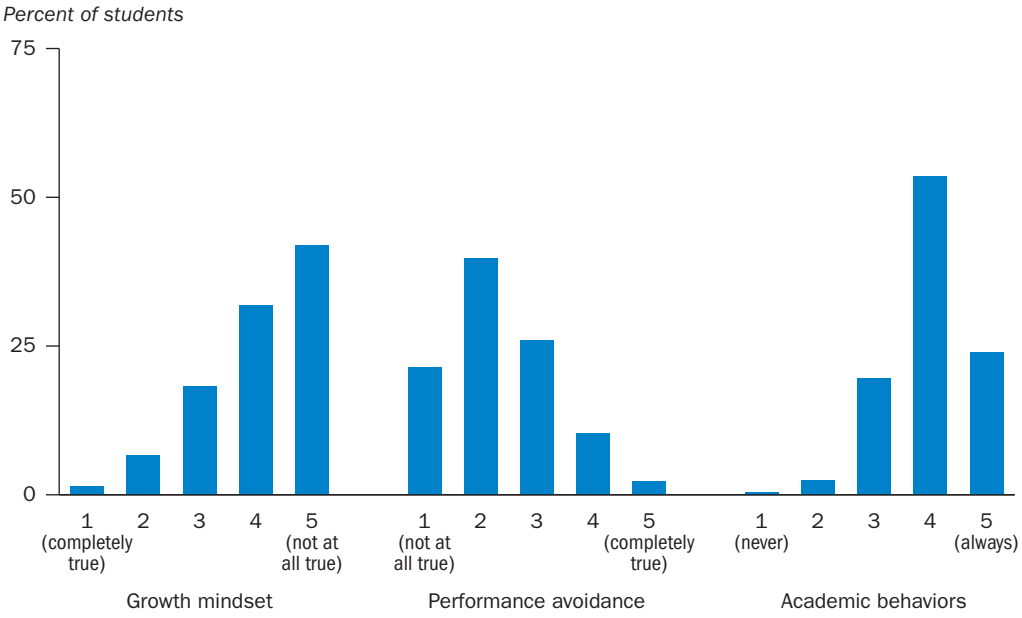
Table 1. Average student growth mindset, performance avoidance, and academic behaviors scores on a Clark County School District survey, by grade level, 2015

Grade level	Growth mindset (1, completely true, to 5, not at all true)		Performance avoidance (1, not at all true, to 5, completely true)		Academic behaviors (1, never, to 5, always)	
	Average score	Standard deviation	Average score	Standard deviation	Average score	Standard deviation
Elementary school (grades 4–5; *n* = 30,326)	3.9	0.96	2.2	0.92	4.1	0.64
Middle school (grades 6–8; *n* = 46,284)	3.9	0.97	2.4	0.94	4.0	0.68
High school (grades 9–12; *n* = 26,456)	4.0	0.96	2.4	0.94	3.9	0.71
All students (*n* = 103,066)	4.0	0.97	2.3	0.94	4.0	0.69

Note: *F*-tests indicated that the differences in average scores across all grade levels were significant at $p < .01$.

Source: Authors' analysis of 2015 survey data and administrative records from Clark County School District.

Figure 2. Most students reported having beliefs consistent with a growth mindset, not engaging in performance avoidance, and engaging in academic behaviors on a Clark County School District survey, 2015



Note: *n* = 103,066. Scores were rounded to the nearest whole number.

Source: Authors' analysis of 2015 survey data and administrative records from Clark County School District.

students was 2.3 on a scale of 1 to 5 (where 1 indicates that it is not at all true that the student engaged in performance avoidance behaviors and 5 indicates that it is completely true that the student engaged in performance avoidance behaviors; see table 1). Just over 61 percent of students had an average response equivalent to either "a little true" or "not at all true" (see figure 2). On the other hand, nearly 39 percent of students had an average performance avoidance score of 3 (somewhat true that the student engaged in performance avoidance behaviors) or higher (see figure 2).

Nearly 39 percent of students had an average performance avoidance score of 3 (somewhat true that the student engaged in performance avoidance behaviors) or higher

The majority of students reported demonstrating academic behaviors at least most of the time. The average academic behaviors score across all students was 4.0 on a scale of 1 to 5 (where 1 indicates that a student reports never engaging in academic behaviors and 5 indicates that a student reports always engaging in academic behaviors; see table 1). Nearly 78 percent of students scored 4 (engages in academic behaviors most of the time) or 5 (see figure 2).

Variation in students' reported levels of growth mindset, performance avoidance, and academic behaviors by grade level, prior academic achievement, sociodemographic characteristics, and school characteristics

Growth mindset, performance avoidance, and academic behaviors varied significantly across grade levels. The variation in average scores across students in elementary, middle, and high school was statistically significant for all three measures (see table 1).[1] For growth mindset the differences across grade levels appear to be composed mostly of differences between high school students on the one hand and elementary school and middle school

students on the other. The average score was 4.0 for high school students and 3.9 for middle school students and elementary school students.

The average performance avoidance score was higher among middle school and high school students than among elementary school students. The average score was 2.2 for elementary school students, compared with 2.4 for middle school and high school students. Students in higher grade levels had lower average academic behavior scores: 4.1 for elementary school students, 4.0 for middle school students, and 3.9 for high school students. In other words, students in higher grade levels tended to report having beliefs that were less consistent with growth mindset, engaging more frequently in performance avoidance, and engaging less frequently in behaviors that support academic success.

When translated into effect size (or standard deviation units) by dividing the difference by the sample standard deviation (Cohen, 1988; Lipsey et al., 2012), the difference in outcomes across the entire grade span was approximately 0.1 standard deviation for growth mindset, 0.2 standard deviation for performance avoidance, and 0.3 standard deviation for academic behaviors. By some standards, differences in performance avoidance and academic behaviors of these effect sizes might be considered policy relevant (Lipsey et al., 2012), but none of the differences on these measures was large enough to suggest that the modal answer differed across grade levels.

Students' levels of growth mindset, performance avoidance, and academic behaviors varied significantly by prior academic achievement, English learner status, and race/ethnicity. Growth mindset and academic behaviors scores were lower and performance avoidance scores were higher for students with lower prior academic achievement (as measured by proficiency category on the Nevada Criterion Reference Tests math assessment) than for students with higher prior academic achievement (table 2). The average growth mindset score was 3.5 for students whose prior academic achievement was at the emergent level, compared with 4.3 for students whose prior academic achievement exceeded the standard, a difference of 0.8 point (or 0.8 standard deviation). The average performance avoidance score was 2.7 for students whose prior academic achievement was at the emergent level, compared with 2.3 for students whose prior academic achievement exceeded the standard, a difference of 0.4 point (equivalent to 0.4 standard deviation). The average academic behaviors score was 3.8 for students whose prior academic achievement was at the emergent level, compared with 4.2 for students whose prior academic achievement exceeded the standard, a difference of 0.4 point (or 0.6 standard deviation).

The average growth mindset score was 3.5 for students whose prior academic achievement was at the emergent level, compared with 4.3 for students whose prior academic achievement exceeded the standard

Growth mindset scores were significantly lower for English learner students than for non–English learner students (see table 2).[2] The average score was 3.5 for English learner students and 4.0 for non–English learner students, a difference of 0.5 point (or 0.5 standard deviation). Performance avoidance and academic behaviors scores were also significantly different between English learner students and non–English learner students, though the differences were not as large. The average performance avoidance score was 2.6 for English learner students, compared with 2.3 for non–English learner students, and the average academic behaviors score was 3.9 for English learner students, compared with 4.0 for non–English learner students. In short, compared with non–English learner students, English learner students reported fewer beliefs that were consistent with a growth mindset, reported engaging more frequently in performance avoidance, and reported engaging less frequently in academic behaviors.

Table 2. Average student growth mindset, performance avoidance, and academic behaviors scores on a Clark County School District survey, by student characteristic, 2015

Student characteristic	Growth mindset (1, completely true, to 5, not at all true)	Performance avoidance (1, not at all true, to 5, completely true)	Academic behaviors (1, never, to 5, always)
All students	4.0	2.3	4.0
(Standard deviation)	(0.97)	(0.94)	(0.69)
Prior academic achievement[a]			
Emergent	3.5	2.7	3.8
Approaches standard	3.8	2.5	3.9
Meets standard	4.1	2.3	4.0
Exceeds standard	4.3	2.3	4.2
English learner status			
English learner student	3.5	2.6	3.9
Non–English learner student	4.0	2.3	4.0
Race/ethnicity[b]			
Asian/Pacific Islander	4.1	2.3	4.1
Black	3.9	2.3	4.0
Hispanic	3.8	2.4	3.9
White	4.1	2.3	4.1
Multiracial	4.1	2.3	4.0

Note: n = 103,066. F-tests indicated that the differences in average scores across all subgroups of each characteristic were significant at $p < .01$.

a. Based on performance on the Nevada Criterion Reference Tests math assessment from the previous academic year for elementary and middle school students and from grade 8 for high school students.

b. Asian includes Native Hawaiian and Other Pacific Islander, Black includes African American, and Hispanic includes Latino.

Source: Authors' analysis of 2015 survey data and administrative records from Clark County School District.

Differences across racial/ethnic groups in growth mindset, performance avoidance, and academic behaviors scores were also significant (see table 2). The patterns suggest that the differences are driven in part by differences between the scores of Black and Hispanic students compared with the scores of White students and Asian students.[3] The average growth mindset score was 3.9 for Black students and 3.8 for Hispanic students, compared with 4.1 for White students and Asian students (see appendix D for results of pairwise significance tests). The average performance avoidance score was 2.4 for Hispanic students and 2.3 for every other racial/ethnic group. The average academic behaviors score was 4.0 for Black students and 3.9 for Hispanic students, compared with 4.1 for White students and Asian students.

The average growth mindset score was 3.9 for Black students and 3.8 for Hispanic students, compared with 4.1 for White students and Asian students

There were no significant differences in levels of growth mindset, performance avoidance, and academic behaviors between students in magnet schools and students in nonmagnet schools. Among the goals of the Clark County School District magnet school program is to increase access to and success in advanced courses that might help students prepare for college. It is possible that magnet schools attract students with different attitudes regarding coursetaking and academic performance. However, there were no significant differences in growth mindset, performance avoidance, or academic behaviors scores between students in magnet and students in nonmagnet schools (table 3).

Table 3. Average student growth mindset, performance avoidance, and academic behaviors scores on a Clark County School District survey, by school characteristic, 2015

School characteristic	Growth mindset (1, completely true, to 5, not at all true)	Performance avoidance (1, not at all true, to 5, completely true)	Academic behaviors (1, never, to 5, always)
Magnet school status			
Magnet school	4.0	2.3	4.0
Nonmagnet school	3.9	2.2	4.1
Average academic achievement[a] (percentage of students scoring proficient in math)			
Lowest quartile (less than 52.7 percent)	3.8**	2.4**	4.0**
Second quartile (52.7–64.2 percent)	3.9**	2.3**	4.0**
Third quartile (64.3–75.5 percent)	3.9**	2.2**	4.1**
Highest quartile (75.6 percent or higher)	4.1**	2.1**	4.1**
English learner status (percentage of students who are English learner students)			
Lowest quartile (less than 6.0 percent)	4.1**	2.2**	4.1
Second quartile (6.0–14.4 percent)	4.0**	2.2**	4.1
Third quartile (14.5–30.4 percent)	3.8**	2.3**	4.0
Highest quartile (30.5 percent or higher)	3.7**	2.3**	4.0
Economically disadvantaged status (percentage of students eligible for the federal school lunch program)			
Lowest quartile (less than 37.5 percent)	4.1**	2.1**	4.1**
Second quartile (37.5–61.5 percent)	4.0**	2.2**	4.1**
Third quartile (61.6–80.8 percent)	3.8**	2.3**	4.0**
Highest quartile (80.9 percent or higher)	3.7**	2.4**	4.0**

** Multiple comparison *F*-tests indicated that the differences in average scores across all subgroups of the characteristic were significant at $p < .01$.

Note: n = 103,066 students across 313 schools.

a. Based on student performance on the Nevada Criterion Reference Tests math assessment from the previous academic year for elementary and middle school students and from grade 8 for high school students.

Source: Authors' analysis of 2015 survey data and administrative records from Clark County School District.

The average growth mindset score was 3.8 for students in schools in the lowest academic achievement quartile, compared with 4.1 for students in schools in the highest quartile

Significant differences in growth mindset, performance avoidance, and academic behaviors scores existed across schools with different average proficiency rates on state achievement tests.[4] The average growth mindset score was 3.8 for students in schools in the lowest academic achievement quartile (as measured by proficiency category on the Nevada Criterion Reference Tests math assessment; see box 1), compared with 4.1 for students in schools in the highest quartile (see table 3). The average performance avoidance score was 2.4 for students in schools in the lowest academic achievement quartile, compared with 2.1 for students in schools in the highest quartile. This suggests that weaker beliefs in the potential to improve, along with fears of failure and embarrassment, are more prevalent at low-achieving schools.

Growth mindset and performance avoidance scores also differed significantly between students in schools with different percentages of English learner students and economically disadvantaged students. The average growth mindset score was lower for students in schools with higher percentages of English learner students and in schools with higher

percentages of economically disadvantaged students than for students in schools with lower percentages of these students (see table 3). The average performance avoidance score was also higher for students in schools with higher percentages of English learner students and economically disadvantaged students than for students in schools with lower percentages of these students.

These findings suggest that there are systematic differences across schools in the extent to which students believe in the malleability of ability and the payoff for academic effort, as well as in the extent to which students have concerns about failure and embarrassment that they believe hamper or undermine their academic efforts. Moreover, the findings suggest that students in low-achieving schools and schools with higher percentages of English learner students and economically disadvantaged students are more inclined to believe that their academic ability is fixed and that additional academic efforts are not likely to lead to improvements in academic performance. Students in these environments also report that they are more concerned that actively participating in class or making an effort to succeed will result in failure and embarrassment and are less engaged in academic behaviors.

Levels of growth mindset, student performance avoidance, and student academic behaviors reported by teachers

A majority of teachers reported having beliefs regarding their students that were consistent with a growth mindset. Teachers reported largely disagreeing with statements suggesting that their students' ability is fixed or that there is only a limited payoff from student effort. The average growth mindset score across all teachers was 4.5 on a scale of 1 to 5 (where 1 indicates agreement with all statements that suggest a fixed-ability mindset and 5 indicates disagreement with all statements that suggest a fixed-ability mindset; table 4). Some 92 percent of teachers scored 4 or 5 (figure 3). Teachers' average score was significantly different from students' average score, which was 0.5 point lower (or 0.5 standard deviation).[5] In other words, teachers were more likely than their students to believe in the potential of students to improve their ability and academic performance through their own efforts.

The average growth mindset score across all teachers was 4.5 on a scale of 1 to 5 (where 1 indicates agreement with all statements that suggest a fixed-ability mindset and 5 indicates disagreement with all statements that suggest a fixed-ability mindset)

Teachers reported significantly higher levels of performance avoidance among their students and significantly lower levels of academic behaviors than students themselves reported. The average performance avoidance score reported by all teachers about their

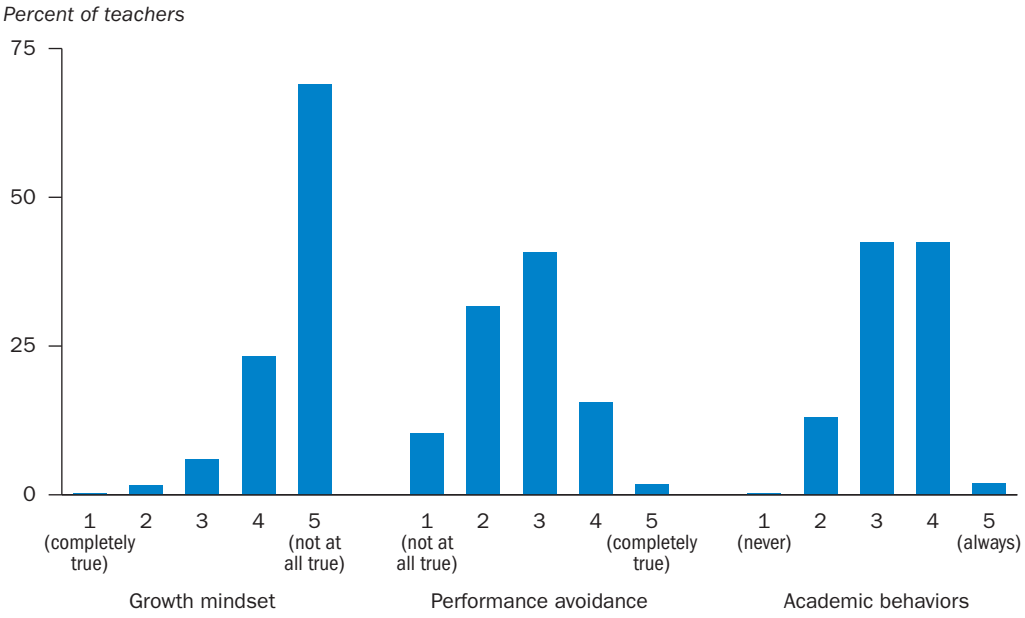
Table 4. Average student and teacher growth mindset, performance avoidance, and academic behaviors scores based on students' responses and on teachers' responses about their students on a Clark County School District survey, 2015

	Growth mindset (1, completely true, to 5, not at all true)		Performance avoidance (1, not at all true, to 5, completely true)		Academic behaviors (1, never, to 5, always)	
Sample group	Average score	Standard deviation	Average score	Standard deviation	Average score	Standard deviation
Students (n = 103,066)	4.0	0.97	2.3	0.94	4.0	0.69
Teachers (n = 5,721)	4.5	0.68	2.7	0.87	3.3	0.67

Note: Independent sample t-tests indicated that the differences in average scores between teachers and students were significant at $p < .01$.

Source: Authors' analysis of 2015 survey data and administrative records from Clark County School District.

Figure 3. Most teachers reported that they had beliefs consistent with a growth mindset and that their students engage somewhat in performance avoidance and academic behaviors on a Clark County School District survey, 2015



Note: *n* = 5,721. Teacher scores on each measure were rounded to the nearest whole number.

Source: Authors' analysis of 2015 survey data and administrative records from Clark County School District.

students was 2.7 on a scale of 1 to 5 (where 1 indicates that it is not at all true that students engaged in performance avoidance behaviors and 5 indicates that it is completely true that students engaged in performance avoidance behaviors). That score was 0.4 point (or 0.6 standard deviation) higher than the average reported by all students (see table 4). The average academic behaviors score reported by all teachers about their students was 3.3 on a scale of 1 to 5 (where 1 indicates that students never engage in academic behaviors and 5 indicates that students always engage in academic behaviors). That score was 0.7 point (or 0.7 standard deviation) lower than the average reported by all students. Thus, while teachers were more likely than students to believe that students' academic performance could improve with effort, teachers were also more likely to report that students are hiding effort and avoiding academically challenging experiences and were less likely to report that students are engaging in the academic behaviors associated with student success.

The average performance avoidance score reported by all teachers about their students was 2.7 on a scale of 1 to 5 (where 1 indicates that it is not at all true that students engaged in performance avoidance behaviors and 5 indicates that it is completely true that students engaged in performance avoidance behaviors)

Variation in teachers' growth mindset and in student performance avoidance and student academic behaviors reported by teachers, by school characteristics

Teachers who taught higher grades reported significantly lower levels of growth mindset, significantly higher levels of student performance avoidance, and significantly lower levels of student academic behaviors than did teachers who taught lower grades.[6] The average teacher growth mindset score was 4.6 among elementary school teachers, 4.5 among middle school teachers, and 4.3 among high school teachers (table 5). The average performance avoidance score reported by teachers about their students was 2.4 among elementary school teachers, 2.9 among middle school teachers, and 3.0 among high school teachers. The average student academic behaviors score reported by teachers was 3.5

Table 5. Average teacher growth mindset scores and student performance avoidance and student academic behaviors scores based on teachers' responses on a Clark County School District survey, by grade level, 2015

Grade level	Growth mindset (1, completely true, to 5, not at all true)	Performance avoidance (1, not at all true, to 5, completely true)	Academic behaviors (1, never, to 5, always)
Elementary school (grades 4–5; *n* = 2,607)	4.6	2.4	3.5
Middle school (grades 6–8; *n* = 1,291)	4.5	2.9	3.1
High school (grades 9–12; *n* = 1,823)	4.3	3.0	3.1
All teachers (*n* = 5,721)	4.5	2.7	3.3
(standard deviation)	(0.68)	(0.87)	(0.67)

Note: Multiple comparison *F*-tests indicated that the differences in average scores across all grade levels were significant at $p < .05$.

Source: Authors' analysis of 2015 survey data and administrative records from Clark County School District.

among elementary school teachers and 3.1 among middle school and high school teachers. These differences suggest that teachers perceive students in higher grade levels as exerting less academic effort and experiencing greater fears of failure or embarrassment connected with making overt efforts at academic success.

Teachers' levels of growth mindset did not appear to differ systematically by school characteristics. Average teacher growth mindset scores did not differ significantly between teachers in magnet schools and teachers in nonmagnet schools, across schools with different average academic achievement, or across schools with different percentages of English learner students (table 6). Average teacher growth mindset scores differed significantly across schools with different percentages of economically disadvantaged students, but the direction of the difference was not consistent, and teachers in schools in the highest quartile reported the same average student score as teachers in schools in the lowest quartile. Teachers seem to express a consistent belief in the malleability of ability and in the payoff for students' academic efforts regardless of the average academic achievement and student sociodemographic characteristics in their schools.

Teachers seem to express a consistent belief in the malleability of ability and in the payoff for students' academic efforts regardless of the average academic achievement and student sociodemographic characteristics in their schools

Teachers reported significantly different levels of student academic behaviors across schools with different percentages of economically disadvantaged students and different levels of student achievement. The average performance avoidance score reported by teachers about their students did not vary significantly across schools with different percentages of English learner students or across schools with different percentages of economically disadvantaged students, but the average academic behaviors score reported by teachers about their students did vary significantly across schools with different percentages of economically disadvantaged students (see table 6). The average academic behaviors score reported by teachers about their students in schools in the highest quartile of economically disadvantaged students was 3.2, while the average score reported by teachers about their students in schools in the lowest quartile was 3.6. In other words, teachers in schools with a higher percentage of economically disadvantaged students reported less frequent overt academic participation among students. There were also significant differences in teacher reports of academic behaviors in schools with different levels of average achievement. At schools serving students with the highest levels of academic achievement,

Table 6. Average teacher growth mindset scores and student performance avoidance and student academic behaviors scores based on teachers' responses on a Clark County School District survey, by school characteristics, 2015

School characteristic	Growth mindset (1, completely true, to 5, not at all true)	Performance avoidance (1, not at all true, to 5, completely true)	Academic behaviors (1, never, to 5, always)
Magnet school status			
Magnet school	4.5	2.8	3.2
Nonmagnet school	4.5	2.6	3.4
Average academic achievement[a] (percentage of students scoring proficient in math)			
Lowest quartile (less than 52.7 percent)	4.6	2.7**	3.1**
Second quartile (52.7–64.2 percent)	4.5	2.7**	3.2**
Third quartile (64.3–75.5 percent)	4.5	2.5**	3.5**
Highest quartile (75.6 percent or higher)	4.5	2.4**	3.7**
English learner status (percentage of students who are English learner students)			
Lowest quartile (less than 6.0 percent)	4.5	2.6	3.4*
Second quartile (6.0–14.4 percent)	4.5	2.6	3.4*
Third quartile (14.5–30.4 percent)	4.6	2.6	3.3*
Highest quartile (30.5 percent or higher)	4.5	2.5	3.4*
Economically disadvantaged status (percentage of students eligible for the federal school lunch program)			
Lowest quartile (less than 37.5 percent)	4.5*	2.5	3.6**
Second quartile (37.5–61.5 percent)	4.4*	2.6	3.4**
Third quartile (61.6–80.8 percent)	4.6*	2.6	3.3**
Highest quartile (80.9 percent or higher)	4.5*	2.6	3.2**

* Multiple comparison *F*-tests indicated that the differences in average scores across all subgroups of the characteristic were significant at $p < .05$; ** multiple comparison *F*-tests indicated that the differences in average scores across all subgroups of the characteristic were significant at $p < .01$.

Note: $n = 5{,}721$ teachers in 302 schools.

a. Based on student performance on the Nevada Criterion Reference Tests math assessment from the previous academic year for elementary and middle school students and from grade 8 for high school students.

Source: Authors' analysis of 2015 survey data and administrative records from Clark County School District.

The average academic behaviors score reported by teachers about their students in schools in the highest quartile of economically disadvantaged students was 3.2, while the average score reported by teachers about their students in schools in the lowest quartile was 3.6

teacher-reported academic behaviors averaged 3.7, compared to 3.1 at schools in the first quartile of academic achievement. This difference is equivalent to 0.9 standard deviation and 0.6 point on the academic behavior scale. There was a statistically significant difference in academic behaviors scores reported by teachers about their students across schools with different percentages of English learner students, but the direction of the differences was not consistent. It is thus difficult to interpret this as evidence of meaningful or consistent differences in teacher reports of academic behaviors across schools serving different percentages of English learner students.

Implications of the study findings

The findings indicate that most students reported beliefs consistent with having a growth mindset. However, the findings also suggest that low-achieving students, Black and Hispanic students, English learner students, and students who attend schools with a higher

percentage of economically disadvantaged students are less likely to report beliefs consistent with a growth mindset than are their higher achieving, White, Asian, non–English learner counterparts and peers in schools with a lower percentage of economically disadvantaged students. The largest gaps in growth mindset scores were between low-achieving and high-achieving students and between English learner and non–English learner students.

Given the evidence from previous research indicating that holding beliefs that are consistent with a growth mindset can improve academic achievement (Blackwell et al., 2007; Farrington et al., 2012; Snipes et al., 2012; Yeager & Walton, 2011), the findings reported here suggests that beliefs about the nature of academic ability and about the payoff for academic effort could be contributing to disparities in academic achievement between English learner and non–English learner students in Clark County School District, as well as potentially reinforcing and exacerbating the gaps between high- and low-achieving students more generally. To the extent that differences in growth mindset drive performance avoidance and suppress academic behavior (Farrington et al., 2012), the findings also suggest that beliefs may be important targets for interventions, particularly among low-achieving students and English learner students (as well as among Black and Hispanic students).

It is possible that the differences in growth mindset are the results of differences in prior academic experiences and outcomes. For example, to the extent that low-achieving or English learner students have more difficult or less rewarding academic experiences, they may have grown discouraged and developed beliefs that are more consistent with a fixed-ability mindset. Interventions designed to challenge and change these fixed-ability beliefs, if combined with appropriate academic supports, could unlock additional student effort (that is, increased academic behaviors) and result in academic progress among low-achieving or English learner students. Further longitudinal research connecting academic mindsets to academic outcomes, along with rigorous studies of interventions targeting academic mindsets among these student groups, would be necessary to fully understand this relationship.

The presence of systematic differences in growth mindset, performance avoidance, and academic behaviors across schools with students with different average academic achievement and schools with different percentages of economically disadvantaged students suggests that school context and its relationship to students' academic mindsets and behaviors may be an important area for further investigation

The differences across individual students with different characteristics appeared to be larger than the average differences across students from schools with different populations. Nevertheless, the presence of systematic differences in growth mindset, performance avoidance, and academic behaviors across schools with students with different average academic achievement and schools with different percentages of economically disadvantaged students suggests that school context and its relationship to students' academic mindsets and behaviors may be an important area for further investigation.

Clark County School District teachers' survey responses suggest that they believe in their students' potential to learn. Teachers' responses to the questions about the malleability of their students' academic ability and the payoff for students' academic effort suggest that teachers' beliefs about the nature and malleability of their students' academic abilities were significantly more consistent with a growth mindset than were students' beliefs about their own abilities. This mindset was evident even among teachers in low-achieving schools and in schools serving a higher percentage of English learner students. Growth mindset scores did not differ between teachers in magnet schools and teachers in nonmagnet schools, by the average academic achievement level of the school, or by the percentage of English

learner students in the school. These patterns suggest that teachers' beliefs may not need to be a primary target of interventions to improve growth mindset among students.

Teachers reported lower levels of academic behaviors and higher levels of performance avoidance among their students than the students themselves reported. This suggests that students assess their academic efforts more favorably than do their teachers. This may be due to different perceptions about the standards to which students should be held (with teachers maintaining a higher standard than students). However, the questions asked about the absolute frequency of specific behaviors rather than about their adequacy, so this may not be the case. Another possibility is that some behaviors that teachers interpreted as performance avoidance were not. It is also possible that students were self-conscious about the adequacy of their efforts and were therefore prone to exaggerate the extent to which they demonstrate socially desirable academic behaviors when responding to the survey.

Though the average scores differed between students and teachers, they followed a similar pattern across grade levels. Both students' and teachers' scores suggest that students in higher grades engage in academic behaviors less frequently than students in lower grades and that students in higher grades are more likely than students in lower grades to avoid academic situations that might push their limits or make them uncomfortable. This suggests that the positive recursive cycle that promotes and reinforces students' positive expectations for success, engagement, and pro–academic achievement behaviors and improved student outcomes may be disrupted as students move into higher grades.

Both students' and teachers' scores suggest that students in higher grades engage in academic behaviors less frequently than students in lower grades and that students in higher grades are more likely than students in lower grades to avoid academic situations that might push their limits or make them uncomfortable

The findings suggest that Clark County School District and districts like it might benefit from developing and implementing supports for positive academic mindsets and behaviors as students move into higher grade levels. Prior research suggests the existence of several low-cost interventions, such as mentoring sessions or seminars that focus on delivering a growth mindset message, that could have a substantial impact on students' academic mindsets and behaviors, thereby improving their academic performance (Snipes et al., 2012, Dweck et al., 2011). Targeting these services to low-achieving or English learner students could be complicated and problematic (inadvertently sending the wrong message to these students about their academic potential). Nevertheless, these students may benefit disproportionately from these programs. Thus, though these interventions may be effective in a wide variety of contexts, these supports may be particularly useful in schools that are low-achieving or have a high percentage of English learner students.

There may also be implications for programs and materials that directly target low-achieving and English learner students. The fact that low-achieving students reported lower levels of growth mindset and higher levels of performance avoidance suggests that educators could work to ensure that programs and materials that target these students reinforce positive messages about their academic potential and the payoff to academic effort. Strategies for supporting positive academic mindsets among low-achieving and English learner students may need to consider the possibility that negative academic experiences are creating or reinforcing negative beliefs about these students' potential or about the value of academic persistence.

The higher levels of performance avoidance among students in higher grade levels suggest that practitioners in Clark County School District and districts like it could look into the academic culture in their classes and schools at the secondary level. It may be important to

examine and address the messages that students receive for making overt academic efforts or for making mistakes in classrooms. To the extent that practitioners want to support academic efforts and increased risk taking, it may be necessary to address those parts of student–teacher or peer-to-peer interactions that create social and psychological penalties for exerting effort or making mistakes.

Finally, the findings underscore the continuing importance of research on how academic mindsets and behaviors evolve as students move through school and of developing and studying intervention strategies that can support continued academic engagement as students transition into higher grades.

Limitations of the study

This study has three main limitations.

First, the data are self-reported. To the extent that concepts such as growth mindset have become popular, teachers and students may be prone to provide answers that they believe are socially acceptable. Nevertheless, previous research has shown that variation in survey measures among students within the same schools is strongly associated with variation in academic outcomes (Farrington & Levenstein, 2013; Farrington et al., 2014; West et al., 2014), suggesting that basic patterns are not distorted by the presence of biases toward socially acceptable answers.

Second, the sample and data come from one year and one district. As a result, the patterns may not be broadly generalizable or representative of what would be observed in different years and across different districts. It will be important to conduct additional research in Clark County School District and in other districts to replicate, refine, and extend these findings, particularly in other larger urban districts.

The patterns found in this study may not be broadly generalizable or representative of what would be observed in different years and across different districts

Third, the response rates among students in some grades and from teachers in general were lower than might be desired. The overall student response rates exceeded 80 percent, but the response rate among students in grades 9–12 was 69 percent (see table B1 in appendix B). Students in grades 9–12 account for the smallest percentage of respondents to the survey (25 percent) and the largest percentage of nonrespondents (46 percent). This suggests that average student responses (when not disaggregated by grade level) could be skewed toward the patterns among elementary and middle school students. Individual-level data were not available on teacher survey response and nonresponse, so neither calculating actual teacher response rates nor comparing the characteristics of teacher respondents and nonrespondents was possible. However, aggregate data suggest that approximately 48 percent of teachers completed the survey (see appendix B). Systematic differences between teachers who did and those who did not respond to the survey may exist. Additional research that more carefully tracks response rates and that generates higher teacher response rates may be necessary before it is possible to ascertain the extent to which these results represent the patterns that would be observed among all teachers in the district.

Appendix A. Survey constructs

This appendix describes the survey measures for growth mindset, performance avoidance, and academic behaviors. The items were initially developed by the Consortium on Chicago School Research as part of the Becoming Effective Learners Survey and have been field tested in previous survey efforts (Farrington et al., 2014). Though the teacher versions of the questions have not been used as extensively as the student versions, the teacher versions have also been field tested in previous studies (Farrington et al., 2014). Both teacher and student survey measures show high internal consistency, or reliability (table A1). The survey measures were analyzed for internal consistency using both Cronbach's alpha and McDonald's omega statistic. For all measures, among teachers and students, both alpha and omega exceeded 0.7, the accepted criterion for internal consistency (Nunnally, 1978).

The Clark County School District survey was available in English and Spanish; 0.8 percent of the student respondents took the survey in Spanish. The internal consistency analysis indicates that all three survey measures were internally consistent, with Cronbach's alpha scores exceeding 0.7, irrespective of whether students took the survey in Spanish or whether respondents were English learner students.

Table A1. Clark County School District survey measures and internal consistency statistics, 2015

	Student version		Teacher version	
Measure	Questions	Reliability[a]	Questions	Reliability[a]
Growth mindset	How true are the following about you? 1. My intelligence is something that I can't change very much. 2. Challenging myself won't make me any smarter. 3. There are some things I am not capable of learning. 4. If I am not naturally smart in a subject, I will never do well in it. Not at all true, A little true, Somewhat true, Mostly true, Completely true [reverse coded 5–1]	.75	How true are the following about your students? 1. Intelligence is something that one can't change very much. 2. Challenging oneself won't make one smarter. 3. There are some things some people are not capable of learning. 4. Only people naturally smart in a subject will truly excel in it. Not at all true, A little true, Somewhat true, Mostly true, Completely true [reverse coded 5–1]	.77
Performance avoidance	In a typical class, how true are the following? 1. I don't participate in discussions because I am afraid people might think I am foolish. 2. I would rather do easy work that I can do well than challenging work where I might learn more. 3. I don't ask questions in class because people might think my questions are not smart. 4. I stop doing work if I feel like I can't do it well. 5. I only volunteer to answer a question if I am sure my answer is right. Not at all true, A little true, Somewhat true, Mostly true, Completely true [coded 1–5]	.77	In a typical class, how true are the following? 1. Students don't participate in discussions because they are afraid people might think they are foolish. 2. Students would rather do easy work that they can do well than challenging work where they might learn more. 3. Students don't ask questions in class because people might think their questions are not smart. 4. Students stop doing work if they feel like they can't do it well. 5. Students only volunteer to answer a question if they are sure their answer is right. Not at all true, A little true, Somewhat true, Mostly true, Completely true [coded 1–5]	.87

(continued)

Table A1. Clark County School District survey measures and internal consistency statistics, 2015
(continued)

	Student version		Teacher version	
Measure	**Questions**	**Reliability[a]**	**Questions**	**Reliability[a]**
Academic behaviors	In a typical class, how often do you: 1. Do the readings or other assigned work to prepare for class. 2. Turn in assignments on the due date. 3. Actively participate in class. 4. Have all of my class materials with me. 5. Do more than what is expected of me. Never, Once in a while, About half the time, Most of the time, Always [coded 1–5]	.74	In a typical class, how often do students: 1. Do the readings or other assigned work to prepare for class. 2. Turn in assignments on the due date. 3. Actively participate in class. 4. Have all of their class materials with them. 5. Do more than what is expected of them. Never, Once in a while, About half the time, Most of the time, Always [coded 1–5]	.86

a. Cronbach's alpha (Cronbach, 1951).

Source: Authors' analysis of 2015 survey data from Clark County School District.

Appendix B. Survey response rates

This appendix discusses the response rates for the Clark County School District survey of students and teachers. Across the sample, 80.2 percent of students that the district attempted to sample responded to the survey (table B1). The response rate was 82.4 percent among students in grades 4–5, 86.9 percent among students in grades 6–8, and 68.6 percent among students in grades 9–12.

Differences in student response rates by gender, English learner status, and race/ethnicity were all less than 3 percentage points (table B2). In part because of the large sample size, the differences were statistically significant, but they do not suggest that the responses of those who completed the survey would be substantially different from the responses of those who did not.

Individual-level data on teacher survey response and nonresponse were unavailable, so neither calculating actual teacher response rates nor comparing the characteristics of teacher respondents and nonrespondents was possible. However, a comparison of the aggregate numbers suggests that, out of approximately 14,000 classroom teachers employed by the district in 2015 responses were received from 6,574 teachers (48.2 percent). This low response rate suggests that there may be significant differences between the characteristics of teachers who did and those who did not respond to the survey. Future surveys could try to increase response rates and to ensure that responses are balanced across schools and teachers with different characteristics.

To assess the potential for response bias, the study team examined differences in the distribution of students across grade levels in the sample of respondents versus nonrespondents. The response percentages among elementary and middle school students were substantially higher than the response percentages among high school students (see table B2). This suggests that the survey analyses that pooled students across grades could underrepresent the beliefs of high school students and be somewhat skewed toward the beliefs of elementary and middle school students relative to the overall district population.

Table B1. Survey response rates among Clark County School District students, 2015

	Respondents		Nonrespondents	
Grade level	Number	Percent	Number	Percent
Elementary school (grades 4–5; *n* = 46,562)	38,374	82.4	7,188	17.6
Middle school (grades 6–8; *n* = 61,175)	53,168	86.9	8,007	13.1
High school (grades 9–12 (*n* = 44,160)	30,293	68.6	13,867	31.4
Overall sample (*n* = 151,897)	121,835	80.2	30,062	19.8

Source: Authors' analysis of 2015 survey data and administrative records from Clark County School District.

Table B2. Characteristics of Clark County School District student respondents and nonrespondents, 2015

Characteristic	Respondents (*n* = 121,835) (percent)	Nonrespondents (*n* = 30,062) (percent)	Difference (percentage points)
Grade level			
Elementary school (grades 4–5)	31.5	27.2	4.3*
Middle school (grades 6–8)	43.6	26.6	17.0**
High school (grades 9–12)	24.9	46.1	–21.2**
Gender			
Female	50.0	47.0	3.0**
English learner status			
English learner student	14.7	16.0	–1.3**
Race/ethnicity[a]			
American Indian	0.4	0.5	–0.1
Asian	8.1	5.5	2.6**
Black	11.7	14.6	–2.9**
Hispanic	43.8	47.1	–3.3*
Native Hawaiian or Other Pacific Islander	1.6	1.5	0.1
White	28.2	25.3	2.9**
Multiracial	6.1	5.5	0.6*
Unknown	0.1	0.0	0.1

* The difference between respondents and nonrespondents is statistically significant at $p < .05$; ** the difference between respondents and nonrespondents is statistically significant at $p < .01$.

Note: Logistic regressions with corrections for clustering of observations within schools were conducted to assess the presence of differences between respondents and nonrespondents. *T*-tests were conducted to assess the presence of significant differences in average characteristics between respondents and nonrespondents. Percentages may not sum to 100 because of rounding

a. Black includes African American, and Hispanic includes Latino.

Source: Authors' analysis of 2015 survey data and administrative records from Clark County School District.

Appendix C. Clark County School District survey sampling strategy

The analysis in this study is based on student and teacher surveys administered by Clark County School District. In order to conserve time in the schools' computer labs and increase the efficiency of survey administration, the district attempted to administer the surveys to every student in its elementary schools and to a random sample of students in its middle and high schools as well as to all teachers in the district. This appendix describes the sampling strategy used for collecting data from middle and high school students as well as the response rates for the survey.

The overall response rate for the survey was 80.2 percent. The analysis was limited to the 103,006 students for whom demographic and academic achievement data were available.

In elementary schools the survey was administered in the morning homeroom class. In middle and high schools the survey was administered to a random sample of students in each English language arts class. According to Clark County School District internal data, 98 percent of middle and high school students were enrolled in an English language arts class. The district randomly selected English language arts courses at each school and administered the surveys to the students in that course until minimum sample requirements were met. The district based its estimates of minimum sample requirements on the following formula:

$$S = \frac{[z^2 * .5(.5 - 1)]/e^2}{[1 + (z^2 * .5(.5 - 1)]/(e^2 * n)}$$

where S is the target sample size, Z is the z score associated with the 95 percent confidence interval (1.96), e is the desired margin of error (0.3), and n is the school population size.

This sampling method resulted in a survey sample of 38,374 elementary school students, 53,168 middle school students, and 30,293 high school students. Students were removed from the sample if they had missing responses to the growth mindset, performance avoidance, and academic behaviors measures or if they were missing data elements from the demographic data files. The final student analytic sample comprised 30,326 elementary school students, 46,284 middle school students, and 26,456 high school students.

Clark County School District did not randomly sample teachers; it attempted to survey every teacher in the district. The district gathered data from 6,574 teachers. Teachers were eliminated from the sample if they were missing responses to the growth mindset, performance avoidance, and academic behaviors measures or school identification information or if they were in schools that were dropped from the analysis because they had fewer than 10 students. The final teacher analytic sample comprised 5,721 respondents, 2,607 from the elementary level, 1,291 from the middle school level, and 1,823 from the high school level.

Appendix D. Pairwise significance tests

This appendix provides the results of significance tests that assess the presence of significant differences between outcomes across two categories (for example, Black students versus White students).

Table D1. Significance tests for pairwise differences in average growth mindset, performance avoidance, and academic behaviors scores among students in Clark County School District, by grade level and race/ethnicity, 2015 (mean difference)

Pair		Growth mindset (1, completely true, to 5, not at all true)	Performance avoidance (1, not at all true, to 5, completely true)	Academic behaviors (1, never, to 5, always)
Grade level				
Elementary	Middle	−0.048	−0.213**	0.163**
Elementary	High	−0.154**	−0.265**	0.268**
Middle	High	−0.106**	−0.053**	0.105**
Race/ethnicity[a]				
Black	Hispanic	0.073**	−0.126**	0.041**
Black	Asian	−0.171**	−0.026	−0.113**
Black	White	−0.166**	0.019	−0.108**
Black	Multiracial	−0.155**	0.029	−0.061**
Hispanic	Asian	−0.244**	0.099**	−0.154**
Hispanic	White	−0.239**	0.145**	−0.149**
Hispanic	Multiracial	−0.229**	0.155**	−0.102**
Asian	White	0.001	0.045*	0.005
Asian	Multiracial	0.016	0.055**	0.052**
White	Multiracial	0.011	0.009	0.047**

* *F*-tests indicated that the difference was significant at p < .05; ** *F*-tests indicated that the difference was significant at $p < .01$.

Note: n = 103,066. Ordinary least squares models with adjustments for within school clustering were estimated to predict survey outcomes.

a. Asian includes Native Hawaiian and Other Pacific Islander, Black includes African American, and Hispanic includes Latino.

Source: Authors' analysis of 2015 survey data and administrative records from Clark County School District.

Table D2. Significance tests for pairwise differences in average growth mindset, performance avoidance, and academic behaviors scores among teachers in Clark County School District, by grade level, 2015 (mean difference)

Pair		Growth mindset (1, completely true, to 5, not at all true)	Performance avoidance (1, not at all true, to 5, completely true)	Academic behaviors (1, never, to 5, always)
Elementary	Middle	0.079*	−0.498*	0.469*
Elementary	High	0.248*	−0.582*	0.428*
Middle	High	0.169*	−0.084**	−0.042

* *F*-tests indicated that the difference was significant at $p < .05$; ** *F*-tests indicated that the difference was significant at $p < .01$.

Note: n = 5,721. Ordinary least squares models with adjustments for within school clustering were estimated to predict survey outcomes.

Source: Authors' analysis of 2015 survey data and administrative records from Clark County School District.

Appendix E. Confirmatory factor analysis

A factor represents the common, or shared, variation among a set of observed variables. Confirmatory factor analysis, which provides a means to test specific hypotheses about the factors underlying a dataset, was applied to test the models from the three variables examined in this study (growth mindset, performance avoidance, and academic behaviors). The goal of the analyses is to test whether the data better fit a model that assumes that the 14 components from these three variables are measures of a single underlying factor or a model that assumes three underlying factors. The framework is based on the assumption that each variable measures a distinct aspect of academic mindsets and behavior.

Confirmatory factor analysis requires that the researcher hypothesize the number of factors and which measured variables (component ratings in this analysis) are associated with each factor. The researcher can then test a number of hypotheses (models with differing numbers of factors and associated variables) and determine which hypotheses best match the available data (that is, which model "fits" the best).

In conducting the confirmatory factory analysis, two models (a one-factor model and a three-factor model) were tested to see which model had the best fit in terms of root mean square error of approximation (RMSEA), comparative fit index (CFI), Tucker-Lewis index (TLI), and the standardized root mean square residual (SRMR). The current study used RMSEA, TLI, CFI, and SRMR to examine whether the model fit is good because these indexes are relatively independent of sample size. An RMSEA of less than or equal to 0.06 generally indicates satisfactory model fit, while an RMSEA of less than or equal to 0.08 indicates reasonable fit, and an RMSEA of anything greater than 0.10 indicates poor fit (Hu & Bentler, 1999). Both the CFI and the TLI range from 0 to 1, with values of 0.90 or greater indicating close or adequate fit (Guay, Marsh, & Boivin, 2003). Finally, the smaller the SRMR, the better the model fit—values less than 0.05 indicate good fit (Hu & Bentler, 1999).

Both models were tested with the maximum likelihood method of estimation in Mplus 6.1 (Muthen & Muthen, 2010). The results suggest that a three-factor model was a reasonable fit and yielded better fit statistics than the one-factor model (table E1).

Table E1. Confirmatory factor analysis for one- and three-factor models for the Clark County School District survey, by sample group, 2015 (n = 103,066)

Sample group and model	Root mean square error of approximation	Tucker Lewis index	Comparative fit index	Standardized root mean square residual
Students (*n* = 103,066)				
One factor	0.116	0.596	0.658	0.098
Three factors	0.057	0.902	0.920	0.043
Teachers (*n* = 5,721)				
One factor	0.170	0.485	0.564	0.136
Three factors	0.081	0.884	0.906	0.057

Source: Authors' analysis of 2015 survey data and administrative records from Clark County School District.

Notes

1. The significance of the differences across all grade levels was evaluated using an *F*-test comparing unrestricted ordinary least squares models that allowed outcomes to vary across grade levels to restricted models that did not. The ordinary least squares models were estimated using corrections to account for the potential clustering of outcomes within schools. In each case the null hypothesis of no differences across grade spans could be rejected (see table 1). The results of additional pairwise comparisons of each grade level to each of the others using the same method are presented in table D1 in appendix D.
2. The survey was available in English and Spanish; 817 students took the survey in Spanish.
3. Black includes African American, Hispanic includes Latino, and Asian includes Native Hawaiian and Other Pacific Islander.
4. The significance of the differences across all grade levels was evaluated using an F-test comparing unrestricted ordinary least squares models that allowed outcomes to vary across schools in different quartiles of average proficiency rates on state achievement tests to restricted models that did not. The ordinary least squares models were estimated using corrections to account for the potential clustering of outcomes within schools. In each case the null hypothesis of no differences across schools in different achievement quartiles could be rejected (see table 3).
5. Effect sizes and standard deviation units for teacher versus student comparisons were calculated relative to the student-level sample standard deviation of 0.97.
6. The significance of the differences in teacher responses across all grade levels was evaluated using an F-test comparing unrestricted ordinary least squares models that allowed outcomes to vary across the three groups to restricted models that did not allow the outcomes to vary across these groups. The ordinary least squares models were estimated using corrections to account for the potential clustering of outcomes within schools. In each case the null hypothesis of no differences across grade spans could be rejected (see table 5). The results of additional pairwise comparisons of each grade level to each of the others using the same method are presented in table D2 in appendix D.

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